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EXAMINER

MCDONALD, RODNEY GLENN

ART UNIT PAPER NUMBER

1753

DATE MAILED: 07/31/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/045,849

Applicant(s)

PARK, YOUNG

Examiner

Rodney G. McDonald

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,4,5,7-17,19-23,25 and 26 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1,4,5,7-17 and 26 is/are allowed.
- 6) ☒ Claim(s) 19-23 and 25 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). ____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____ 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 19-21 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seeser (U.S. Pat. 5,879,519) in view of Alwan (U.S. Pat. 6,068,878).

Seeser teach in Fig. 22 a sputter deposition apparatus comprising central processing chamber conveyor 93 for transporting a number of substrates; central processing chamber 82, and at least one deposition device 101. Loading platform 92 and unloading platform 94 transfer substrates into and out of the chamber respectively. RF can be applied since it provides cleaner and more stable power (column 26 lines 50-60). The cathode is a sputtering target with a rectangular shape as shown in Fig. 4. The target material is a metal. (Column 19 lines 64-65) Seeser is drawn to optical coatings, therefore the target is comprised of materials having optical transmission properties such as silica, titania, etc. (Column 6 lines 25-30) Fig. 4 shows a rectangular planar magnetron. Isolating shields 106 separates plural deposition sources 101, 102, 103, and 104 in Fig. 22. Loading and unloading chambers are separated from the central processing chamber as shown in Fig. 22 and have separate pumping means to alter the pressure in the load/lock chambers. Referring again to system 80, Fig. 22, to illustrate the operation of an in-line system, initially the locks or

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doors 87, 88 and 91 are closed and the process chamber 82 and unload chamber 83 are pumped to a background pressure of about 10⁻⁶ Torr (Column 20 lines 35-39)

As to the method, again Seeser places substrates onto conveyor 93, these substrates are exposed to a deposition material from sources 101, 102, 103 and 104. and are unloaded from the belt 93 into load/lock chamber 83. (Applies to claim 19) The system is a sputtering system. (Applies to claim 20) The background pressure is about 10⁻⁶ Torr. (Column 20 lines 35-39 as applies to claim 21) The substrates conveyed in Fig. 22 are inherently held by friction. (Applies to claim 19) Seeser also teach depositing on Plastic eyeglass lenses. (Column 31 lines 18)

The differences between the instant claims and Seeser are that Seeser does not disclose that the conveyor in the in-line system is a web, that the web is a polymeric web, and that the substrates are held by eletrostatic attraction.

While the in-line system of Seeser is not explicit as to the nature or make-up of the conveyor 93, the worker of ordinary skill would have found it obvious to use a web conveyor considering the complete teachings of Seeser.

The system of Seeser, in Fig. 22 employs a conveyor. Seeser discloses that the substrates are mounted on a web for processing (Column 5 lines 18-24). Spaced substrate surfaces are used in various systems, including: cylindrical processing configurations in which substrates are mounted for movement about a single rotational axis, rotating cylindrical carrier; double rotational carriers such as a rotating planetary gear carrier; axially translatable and spiral path rotating cylindrical systems; rotating cylinder and spider systems which include individual flip or rotary substrate carriers;

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rotating disk systems in which the disk and the processing stations are adapted for radial movement relative to one another; and continuous web or belt systems, including a symmetrical dual web version (Column 3 lines 36-49)

Thus Seeser establishes that continuous web or belt systems can be employed as the conveyor means upon which substrates can be positioned for processing.

Alwan teaches transporting substrates utilizing a belt which can be made of rubber, fabric and/or metal. For example, belt 30 can comprise a flexible polymer film, such as Mylar. (Column 3 lines 61-65) There are various ways to adhere a substrate to belt 30 without adhesive. Such applications can include, for example, applications in which electrostatic forces are utilized to adhere a substrate 32 to a belt 30. (Column 6 lines 35-40)

The motivation for utilizing a web that is a polymer that holds substrates by electrostatic attraction while moving is that it allows for allowing removal of the substrate. (Column 6 lines 41)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the teachings of Seeser by configuring the conveyor in the in-line embodiment of Fig. 22 to be a continuous web since Seeser teaches that such means are employed as a conveyor for substrates in a sputter deposition system and to have utilized a polymeric web that attracts a substrate by electrostatic attraction as taught by Alwan because it allows for allowing removal of the substrate.

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Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Seeser et al. in view of Alwan as applied to claims 19-21 and 25 above, and further in view of Kawamata et al. (U.S. Pat. 5,958,155).

The differences not yet discussed is the process condition for the RF power.

Seeser uses magnetron-sputtering device. While Seeser does not disclose the particulars of a RF power source, selection of said Rf source with a frequency between 10 and 30 MHz is known in the art. An alternating potential at radio frequencies (RF) typically is used when the target is a dielectric material. Most commonly, the radio frequencies used for such sputtering are at the particular radio frequencies reserved by communications authorities for industrial, scientific and medical uses, the so-called "ISM" frequencies, most typically about 13.56 MHz or higher. (Applies to claim 22)

RF sputtering of materials, such SiO₂ can be done with a power between 100 and 5,000 W as evidenced by Kawamata. Increasing the power generally increases the sputtering rate. (See Fig. 2)

The motivation for selecting the power is that it allows for controlling the deposition rate. (See Fig. 2 Kawamata)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Seeser by utilizing selected process conditions for RF power as taught by Kawamata because it allows for controlling the deposition rate.

Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Seeser et al. in view of Alwan as applied to claims 19-21 and 25 above, and further in view of

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Vossen et al. "Thin Film Processes", pp. 151, 1978, Kawabata et al. (U.S. Pat. 4,952,295) and Hope et al. (U.S. Pat. 4,437,966).

The differences not yet discussed is the relationship defining selection of the roll speed.

Seeser moves the substrate past various sputtering sources 101 through 104 as discussed above. Target materials of differing compositions have different rates of sputtering (See Vossen page 151). Film thicknesses are a desired process-dependent variable. Having set a film thickness or film thickness, the ordinary worker would have to take into account the deposition rate of the deposited materials with respect to the speed the substrate is moved in order to achieve the desired deposition thickness. IF the speed is too fast for a given deposition rate, the film thickness will be insufficient. If the speed is too slow for the same deposition rate, the film thickness will exceed the desired thickness.

A substrate is subjected to sputtering from the sputtering targets while being moved at an adequately high speed relative to a deposition rate from each sputtering target so that extremely thin layers of the respective components are sequentially stacked repeatedly a plurality of times to thereby form a deposition film of a composite material in which the plurality of different components are mixed uniformly (abstract of Kawabata). Hope also teaches that the speed of the substrate is variable that is adjusted relative to the deposition rate and film thickness of a material to be deposited (abstract).

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A particular parameter must first be recognized as a result-effective variable, i.e., a variable that achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation. IN re Antonie, 559 F2d618, 195 USPQ 6 (CCPA 1977).

Thus optimizing a speed of a moving substrate relative to the materials to be deposited would have been obvious to achieve the desired deposition film thickness while the substrate is traversed throughout the processing system.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Seeser by setting the speed of the substrate to move relative to the deposition rates of the materials to be deposited and to the material which has a "narrow process window" since it would have optimized the process to achieve the desired film coating on a substrate without insufficient or excessive material deposits forming on the substrate.

Allowable Subject Matter

Claims 1, 4, 5, 7-17 and 26 are allowed.

The following is a statement of reasons for the indication of allowable subject matter:

Claims 1, 4, 5, 7-17 and 26 are allowable over the prior art of record because the prior art of record does not teach the claimed subject matter including a first moving platform which moves in an x direction and a y direction, which transfers a substrate onto the continuously moving web; and a second moving platform which moves in an x

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direction and a y direction, which transfers a substrate from said continuously moving web.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rodney G. McDonald whose telephone number is 703-308-3807. The examiner can normally be reached on M- Th with Every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X. Nguyen can be reached on 703-308-3322. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9310 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.



Rodney G. McDonald
Primary Examiner
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RM
July 25, 2003